Claims

[c1] A simulation system for simulating an operation of an automotive vehicle comprising:

an input providing vehicle information and path information;

a controller having a vehicle computer model therein, said controller programmed to determine a rear side slip angle of a vehicle computer model;

when the rear side slip angle is greater than a threshold, determine a look ahead scale factor;

when the rear side slip angle is greater than the threshold, increase a look ahead point as a function of the look ahead scale factor;

determining a steering wheel angle input to the computer model by comparing the look ahead point and the intended path;

operate the computer model with the steering wheel angle input; and

generate an output in response to the vehicle model and the initial steering wheel input or the first steering wheel input.

[c2] A system as recited in claim 1 wherein the threshold is

about 15 degrees.

[c3]   A method as recited in claim 1 wherein said controller is programmed to determine a longitudinal vehicle velocity and a lateral vehicle velocity and determining the rear side slip angle as a function of the longitudinal vehicle velocity and the lateral vehicle velocity.

[c4]   A system as recited in claim 1 wherein said controller is programmed to determine a look ahead scale factor as a function of the rear side slip angle.

[c5]   A system as recited in claim 1 wherein said controller is programmed to determine a look ahead factor as a function of an exponential of the rear side slip angle.

[c6]   A system as recited in claim 1 wherein said controller is programmed to determine a look ahead factor as a function of an exponential of a product of the rear side slip angle and a constant.

[c7]   A system as recited in claim 6 wherein the constant is about .02.

[c8]   A system as recited in claim 1 wherein when the rear side slip angle is not greater that the threshold, determining an unscaled look ahead factor.

[c9]   A system as recited in claim 1 wherein the controller is

programmed to determine a steering wheel angle input when the vehicle is not on target.

[c10] A method of operating a vehicle computer model having vehicle information and path information therein comprising:
determining a rear side slip angle of a vehicle computer model;
when the rear side slip angle is greater than a threshold, determining a look ahead scale factor;
when the rear side slip angle is greater than the threshold, increasing a look ahead point as a function of the look ahead scale factor;
determining a steering wheel angle input to the computer model by comparing the look ahead point and the intended path; and
operating the computer model with the steering wheel angle input.

[c11] A method as recited in claim 10 wherein the threshold is about 15 degrees.

[c12] A method as recited in claim 10 wherein determining a rear side slip angle comprises determining a longitudinal vehicle velocity and a lateral vehicle velocity and determining the side slip angle as a function of the longitudinal vehicle velocity and the lateral vehicle velocity.

[c13] A method as recited in claim 10 wherein determining a look ahead scale factor comprises determining a look ahead factor as a function of the rear side slip angle.

[c14] A method as recited in claim 10 wherein determining a look ahead scale factor comprises determining a look ahead factor as a function of an exponential of the rear side slip angle.

[c15] A method as recited in claim 10 wherein determining a look ahead scale factor comprises determining a look ahead factor as a function of an exponential of a product of the rear side slip angle and a constant.

[c16] A method as recited in claim 15 wherein the constant is about .02.

[c17] A method as recited in claim 10 wherein when the rear side slip angle is not greater that the threshold, determining an unscaled look ahead factor.

[c18] A method as recited in claim 10 further comprising performing the step of determining a steering wheel angle input when the vehicle is not on target.

[c19] A method of operating a vehicle computer model having vehicle information and path information therein comprising:

determining a rear side slip angle of a vehicle computer model;

determining a look ahead point;

when the rear side slip angle is greater than a threshold, determining a look ahead scale factor;

when the rear side slip angle is greater than the threshold, increasing the look ahead point as a function of the look ahead scale factor;

when the rear side slip angle is less than the threshold, maintaining the look ahead point;

when the vehicle model is off target, determining a steering wheel angle input to the computer model as a function of an error between the look ahead point and the intended path; and

operating the computer model with the steering wheel angle input.

[c20] A method as recited in claim 19 wherein determining a look ahead scale factor comprises determining a look ahead factor as a function of an exponential of the rear side slip angle.